



1013395

**WHEELING PITTSBURGH STEEL CORPORATION  
MARTINS FERRY, OHIO PLANT  
WASTE MINIMIZATION TRACKING  
1988 BASE YEAR**

Note: All shaded entries are estimated using production indices. Doted areas are calculated estimates.  
NA denotes Not Applicable

WASTE	1988 QUANTITY (tons)	1995 QUANTITY (tons)	1988 COST (US \$)	1995 COST (US \$)	1995 vs. 1988 COST BALANCE (US \$)
<b>HAZARDOUS - DISPOSAL</b>					
Waste Combustible Liquid (Safety-Kleen)	NA	1.77	NA	\$1,836	\$1,836
Waste Paint Related Material (Safety-Kleen)	NA	1.45	NA	\$2,850	\$2,850
Waste Flammable Liquids (Safety-Kleen)	NA	1.50	NA	\$3,975	\$3,975
Debris with Sulfuric Acid and HCl (Wayne)	266	NA	\$54,530	NA	(\$54,530)
Waste Corrosive Solids (American Waste)	64.43	59.11	\$3,630	\$3,330	(\$300)
Alkali Hazardous Waste (American Waste)	23.86	21.89	\$7,235	\$6,637	(\$597)
Hazardous Waste Solid (American Waste)	16.23	14.89	\$11,559	\$10,605	(\$954)
					\$0
					\$0
					\$0
					\$0
					\$0
<b>TOTAL HAZARDOUS DISPOSAL</b>	<b>370.5</b>	<b>100.6</b>	<b>\$76,954</b>	<b>\$29,233</b>	<b>(\$47,721)</b>
<b>HAZARDOUS - RECYCLE</b>					
Waste Petroleum Naptha (Safety-Kleen)	6		\$67,104		(\$67,104)
Waste Oil					\$0
					\$0
					\$0
					\$0
<b>TOTAL HAZARDOUS RECYCLE</b>	<b>6.0</b>	<b>0.0</b>	<b>67,104</b>	<b>0</b>	<b>(\$67,104)</b>
<b>NON-HAZARDOUS - DISPOSAL</b>					
Wastewater Treatment Sludge (Am. Waste)	1,325.77	1,216.3	\$19,245.30	\$17,656.24	(\$1,589)
Wastewater Treatment Sludge (ROHRIG)	13.83	12.7	\$486.46	\$446.29	(\$40)
Galvanizing Line Baghouse Dust(Armoni)	1,042.85	956.7	\$69,470.93	\$63,734.80	(\$5,736)
Trash & Debris (American Waste)	483.76	443.8	\$41,205.79	\$37,803.48	(\$3,402)
Trash & Debris (Ohio Valley Sanitation)	1,590.39	1,459.1	\$59,754.92	\$54,821.03	(\$4,934)
					\$0
					\$0
					\$0
<b>TOTAL NON-HAZARDOUS DISPOSAL</b>	<b>4,456.6</b>	<b>4,088.6</b>	<b>\$190,163</b>	<b>\$174,462</b>	<b>(\$15,702)</b>
<b>NON-HAZARDOUS - RECYCLE</b>					
Spent Solvent (Safety-Kleen)	NA	5.75	NA	\$8,500.00	\$8,500
Waste Oil (Wallover)		130.0			
Zinc Dross	190.31	174.6	NA	No Cost	
Zinc Skimmings	3,474.43	3,187.6	NA	No Cost	
<b>TOTAL NON-HAZARDOUS - RECYCLE</b>	<b>0.0</b>	<b>5.8</b>	<b>0</b>	<b>8,500</b>	<b>\$8,500</b>
<b>TOTAL DISPOSAL</b>					
<b>TOTAL DISPOSAL</b>	<b>4,827.1</b>	<b>4,189.2</b>	<b>\$267,117</b>	<b>\$203,695</b>	<b>(\$63,422)</b>
<b>TOTAL RECYCLE</b>					
<b>TOTAL RECYCLE</b>	<b>6.0</b>	<b>5.8</b>	<b>\$67,104</b>	<b>\$8,500</b>	<b>(\$58,604)</b>
<b>TOTAL WASTE GENERATION</b>					
<b>TOTAL WASTE GENERATION</b>	<b>4,833.1</b>	<b>4,195.0</b>	<b>\$334,221</b>	<b>\$212,195</b>	<b>(\$122,026)</b>
<b>%REDUCTION</b>					
<b>%REDUCTION</b>		<b>15.21%</b>		<b>57.51%</b>	
<b>%RECYCLE</b>					
<b>%RECYCLE</b>	<b>0.1%</b>	<b>0.1%</b>	<b>20.1%</b>	<b>4.0%</b>	

**WHEELING - PITTSBURGH STEEL CORPORATION**  
**MARTINS FERRY WASTE MINIMIZATION PROGRAM**  
**RECOMMENDED ACTION ITEMS**

AS OF JANUARY 26, 1998

Waste Minimization Team	Recommended Action Items	Waste/Resource Reduced	Estimated Reduction (%)	Anticipated Savings (\$ per year)	Recommended Actions		Implementation Responsibility	Implementation Date
					Installed	Priority Rank		
<b>I. GALVANIZING LINE BAGHOUSE DUST</b>	Renegotiate Disposal Costs 1996 versus 1995	Baghouse Dust Disposal Transportation Costs Liner Costs	15.0% 24.0% 63.0%	\$3,957 \$11,260 \$4,435	Complete	1	Larry Boroski	12/31/95
	Wash all Steel at Yorkville	Waste Generation	5.0%	\$2,200	Instituted on October 1, 1997	2	Production	10/01/97
	Use Bulking Agents	Transportation Costs	25.0%	\$6,000	Investigating	3	Larry Boroski	03/30/98
	Determine how other facilities handle dust	Baghouse Dust Disposal	N/A	N/A	Complete	4	Larry Boroski, Jim Kline, Ed Soboslay	01/27/98
	Determine the amount of aluminum used	Waste Generation	N/A	N/A	Investigating	5	Ed Soboslay, Jim Rockey	03/30/98
	Determine any production changes	Waste Generation	5.0%	\$2,200	Link generation with production parameters	6	Larry Boroski, Lisa Romito, Ed Soboslay	03/30/98
	Sell as an aggregate	Disposal Costs	100.0%	\$44,000	None - material too light, hard to handle	7	Larry Boroski, Pat Smith	01/27/98
	Send to Sinter Plant	Disposal Costs	100.0%	\$44,000	Collect analytical data for total metals	8	Larry Boroski, Lenny Vinci	01/27/98
	Mix with WWTP Sludge	Disposal Costs	None	None	Cannot handle the material	9	Larry Boroski	01/27/98
<b>II. TRASH AND DEBRIS</b>	Purchase or lease trash compactor	Decrease Volume of waste	25.0%	\$6,000	Negotiating with disposal firm to supply	1	Larry Boroski	03/30/98
	Eliminate vacuum hoses from disposal	Decrease Volume of waste	5.0%	\$1,000	Instruct employees and contractors	2	Larry Boroski	01/01/98
	Recycle steel drums to BOF	Decrease Volume of waste	10.0%	\$1,500	Ship cleaned empty drums to BOF	3	Larry Boroski	01/01/98
	Trash segregation	Decrease Volume of waste	5.0%	\$1,000	Instruct employees and contractors	4	Matt Prati, Dick Byrne, Larry Boroski	
	Trash segregation	Decrease Volume of waste	5.0%	\$1,000	Instruct supervisors	5	Pat Smith	
	Conduct Plant Audit	Number of Boxes	5.0%	\$1,000	Instituted on January 1, 1998	6	Matt Prati, Dick Byrne, Larry Boroski	03/30/98
	Replace 4 by 4 compactor with 8 cu.yd. boxes	Number of Boxes	5.0%	\$1,000	Negotiating with contractor	7	Larry Boroski	03/30/98
	Recycle Wood Pallets	Decrease volume of waste	25.0%	\$6,000	Millwood Pallet Co. contacted, no response	8	Larry Boroski, Pat Smith	03/30/98
	Recycle coil wrapping paper	Decrease volume of waste	25.0%	\$6,000	Investigating along with #4	9	Larry Boroski	03/30/98
<b>III. WWTP SLUDGE</b>	None Planned	N/A	N/A	N/A	Minor Expense 1995 = \$20,000	N/A	Larry Boroski	01/27/98

02/02/99

**MARTINS FERRY PLANT  
WHEELING-PITTSBURGH STEEL CORPORATION  
GALVANIZING LINE BAGHOUSE DUST WASTE MINIMIZATION MEETING  
GALVANIZING LINE BAGHOUSE DUST ASSESSMENT TEAM  
DECEMBER 16, 1997**

Galvanizing Line Baghouse Dust Assessment Team Personnel

Larry Boroski - Area Manager, Envr. and Services (304) 234-7250  
Lenny Vinci - Area Manager, Galvanize (304) 234-7303  
Pat Smith - WPSC Environmental Coordinator - (614) 859-6766  
Lisa Romito - WPSC Environmental Coordinator (614) 283-5542  
Ed Soboslay - Waste Minimization Facilitator (412) 269-5905  
Jim Kline - Waste Minimization Investigator (412) 269-5869

**Waste Minimization Opportunities**

**A) Operating Conditions**

There are three galvanizing lines at Martins Ferry, the 36-inch, the 48-inch, and the 60-inch. Each of the Galvanizing Lines has a Welder/Side Trimmer where coils are welded together and the edges of the coil strip are cut. The next step, alkali cleaning, cleans the strip of HSM residues and is followed by a rinse section. Contained in the alkaline cleaning baths is a Quaker manufacturer product (formerly Elf Atochem SM 111L was used), a strong liquid alkali which is a mixture of sodium hydroxide, sodium hexametaphosphate, sodium carbonate, and water. A pickling tank containing 28% HCl is followed by a rinse tank. An ammonium chloride flux tank follows the pickle section. Next, the coating section with galvanizing line dryers using natural gas as their fuel source are followed by the molten zinc pot. The strip is directed through an air cooled duct then further cooled by a quench water tank. The leveler and tensioner reduce crown and straighten the strip. At this point depending on customer specifications, the strip can be directed to the chromium tank which either contains Oakite Okemcoat F1 or F2. Oakite Okemcoat has historically been delivered in 55-gallon drums, but will be delivered in 450-gallon totes in the near future. Okemkite F1 contains 10-20% by weight phosphoric acid, 10-20% chromium trioxide as hexavalent chromium, and 10-20% chromium phosphate. Okemkite F2 contains less than 10% chromium phosphate, less than 10% chromium trioxide, and less than 5 percent by weight nitric acid. The strip is then labeled or (branded) at the stencil machines, then coated with oil by a felt roller to prevent corrosion and finally coiled. Presently, the 48-inch and 60-inch galvanizing lines operate on a 20 turn schedule; the 36-inch galvanizing line operates on a 10 to 12 turn schedule.

Dusts are formed when the strip contacts the Molten Zinc Pot. Four baghouses containing 357 bags per house are used to capture the zinc particulates. One baghouse is used for each galvanizing lines with one baghouse used as a spare. Dust generated at any of the galvanizing lines can be directed to the spare baghouse. The dust is loaded in a 30 cubic yard roll-off box. However, each fully loaded roll-off box only contains 5 to 6 tons of dust. A recent analysis of the dust has been performed.

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The galvanizing steel produced versus the amount of baghouse dust generated and waste disposal cost are presented in the following table:

YEAR	PRODUCTION (tons)	BAGHOUSE DUST (tons)	DISPOSAL COSTS
1997			
1996	535,077	892.95	\$44,083
1995	700,485	956.74	\$63,735
1994	620,000	639.18	No Data
1993	567,000	No Data	No Data
1988	639,986	1042.85	\$69,471

2 - 1996 disposal cost based on \$130 per pull, \$11 per liner, and \$17 per ton.

3 - 1995 disposal cost based on \$170 per pull, \$30 per liner, and \$20 per ton.

Comparing 1996 and 1995, galvanize production decreased 23.6% from 700,485 tons in 1995 to 535,077 tons in 1996, but the generation of baghouse dust decreased only 6.7% from 956.74 tons in 1995 to 892.95 tons in 1996. The generation of dust per ton of galvanize production has steadily increased from 1994 to 1995 and 1996.

Five grades of steel are processed at Martins Ferry. The largest tonnage steel grade processed is SQ (A through E) Full Hard. The other grades processed are DQ SK (automotive product); DQ; CQ; and LFQ. The 36-inch galvanizing line and 60-inch galvanizing line are dedicated to producing Full Hard for Wheeling Corrugating (350,000 tons per year).

The increased production of dust in 1995 and 1996 may be due to the product mix. The heavier gauges of steel require more flux and slower operating speeds which will increase the amount of dust generated. Also the higher baume of the flux generates additional skimmings which results in more dust. In 1994, Martins Ferry used 502,00 gallons of flux and in 1995, 679,000 gallons were used. The flux is added to the strip to prepare the strip surface just prior to the zinc pot. The flux is burned off creating dust which increases the production of zinc dross. The flux used is GF-60 Liquid Flux manufactured by Zaclon which contains 40 percent zinc chloride and 20 percent ammonium chloride. Prior to 1994, a number of different manufacturers supplied the flux. The baume rate, which the rate at which the flux is added to the strip, or water/ammonium chloride ratio is 30 for the 60-inch line, 25 for the 48-inch line, and 22 for the 36-inch line.

Zinc dross is both skimmed from the surface of the zinc pot and drawn off the bottom of the pot at 30 to 45 minute intervals. Richie Metals recycles the zinc dross and recovers the zinc. In 1995, 4,954 tons of skimmings and 225 tons of zinc dross were shipped off-site for recycling.

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The Griffin manufactured baghouse has been reconfigured and adapted according to the needs of Martins Ferry. The pulse-jet baghouse operates such that when the pressure in the baghouse drops to a certain set point, the pulse system starts up. The dust falls into a disposable plastic bag contained in a 30-yard roll-off box. The dust is a very light, powdery dry material which when mixed with water dries to a consistency of concrete.

The generation of baghouse dust is dependent on the quantity of steel processed and the amount of flux used. The amount of dust generated increased in 1996 with the processing of unwashed steel from Yorkville. However, this is not a current problem. During 1996, 955 tons of dust were generated during the production of 535,077 tons of galvanize product.

**B) Galvanizing Baghouse Dust Waste Minimization Ideas:**

- 1) Martins Ferry has successfully reduced disposal costs for galvanizing line baghouse dust from \$20 per ton in 1995 to \$17 per ton in 1996. Transportation costs were reduced from \$170 per pull in 1995 to \$130 in 1996. Liner costs were reduced from \$30 to \$11 per liner.
- 2) Galvanizing Line Baghouse dust is not a suitable charge material for the Sinter Plant because of the high zinc concentration. An analysis of the baghouse dust will be performed weekly for total metals. A means of bulking the material is being investigated to eliminate the dust problem and shipment of light loads. Bulking the baghouse dust will increase the tonnage and decrease the number of pulls thereby reducing transportation costs.
  - a.) Larry Boroski will collect samples on a weekly basis by blowing down the baghouse. Production, operating data, and steel grade information will be collected on the galvanizing lines at the time of sampling. Lisa Romito will have the samples analyzed at the Coke Plant laboratory. Lisa Romito will obtain other pertinent analytical information as required.
  - b.) Larry Boroski will meet with Kroff, a chemical services company, who supplies wastewater treatment and boiler chemicals, to discuss potential bulking agents. A treatability study may be required to determine the best recycle/re-use options for the dust.
  - c.) One available option may be to market baghouse dust as an aggregate addition to a cement company.
- 3) There are three galvanizing lines in the U.S. which use similar flux lines in their operation.
  - a) Bethlehem Steel in Lackawanna, NY, is believed to use a wet scrubber to capture the dust. Ed Soboslay will contact Bethlehem to determine the capture, control, and

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disposal methods being used. In addition, the type and amount of flux used per ton of production will be investigated.

- b) WCI in Warren, Ohio. Jim Kline contacted WCI Environmental Control on December 19, 1997. WCI captures the baghouse dust with a closed roll-off box and BFI disposes the material in a landfill.
  - c) Armco, Dover, Ohio - Larry Boroski will contact the plant manager to determine what Armco does with the galvanizing line baghouse dust.
  - d) Larry Boroski will contact USA Waste to determine if they know of any practical options for reusing or recycling the baghouse dust.
- 4) The quantity of die cast metal added to the zinc pot in 1995 and 1996 will be investigated by Ed Soboslay who will obtain information from Jim Rockey.

**Next Meeting:**

**Tuesday, January 27, 1998 at 10:00 AM**

cc: Barbara Polinski - 3 copies: BES / WRS/ ECMF